

## WHAT IS MICROCLIMATE CONDITIONING?

Provides cooling or heating to the body to  
enhance performance and prevent injury.

### A MICROCLIMATE COOLING SYSTEMS IS:

A garment and/or device worn by the individual  
to reduce thermal burden associated with physical  
activity, temperature, solar load, humidity while on  
maneuvers or encapsulated in protective clothing.

### APPLICATIONS:

- Military
- Medical
- Emergency Response
- Commercial



"WITHOUT COOLING,  
HE'S A CASUALTY!"



"WITH COOLING,  
HE'S A WARRIOR!"



## MICROCLIMATE CONDITIONING CAPABILITIES

Expertise in Personal  
Cooling & Heating

INDIVIDUAL  
PROTECTION



DIRECTORATE

### US ARMY NSC IPD CHEMICAL TECHNOLOGY TEAM

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US ARMY  
NATICK SOLDIER CENTER



# IPD: MICROCLIMATE CONDITIONING CAPABILITIES

## EXPERIENCE:

Since 1982, Natick Soldier Center (NSC) has been in the forefront of the development of microclimate conditioning systems for military use. Our expertise is recognized through serving in a consultant and development capacity to other government agencies, civilian organizations, and academia. With a team that consists of mechanical and chemical engineers, textile technologists, clothing designers, test and evaluation engineers, physiologists, and acquisition specialists, NSC provides all the necessary services for any aspect of microclimate conditioning.

## CAPABILITIES:

A combination of expertise and state-of-the-art facilities affords NSC the ability to conduct all aspects of research and development (R&D) for microclimate conditioning systems. We are an independent evaluator for assessing the latest available technologies.

- Identification of available technology and integration into existing systems
- Laboratory and human evaluation of systems and component performance
- Modification of off-the-shelf systems to meet customers' needs
- Development of innovative conditioning systems
- Investigation of novel technologies for special applications
- Program management from conception to culmination

## EXPERTISE IN:

- Active and Passive Air Ventilation Systems
- Closed Loop, Liquid Circulating Microclimate Cooling/Heating Systems
- Phase Change, Vapor Compression, Adsorption, Thermoelectric Technologies
- Development of Cooling Garments
- Human and Platform Integration of Microclimate Cooling Systems
- Test and Evaluation of Microclimate Cooling Systems

## RECENT ACCOMPLISHMENTS:

- Development of a Microclimate Cooling Garment for U.S. Army helicopter air crew (Air Warrior)
- NSC test method used as the basis for an ASTM standard for evaluating Microclimate Cooling Systems on a thermal manikin
- Worked with OGAs and industry partners to develop/integrate a Microclimate Cooling System for HMMWVs
- Worked with an industry partner to develop a Body Ventilation System

## PARTNERSHIPS IN R&D:

- US Army Research Institute of Environmental Medicine (USARIEM)
- US Army Program Executive Office Soldier (PEO Soldier)
  - US Army Product Manager Air Warrior (PM Air Warrior)
- US Army Tank-Automotive and Armaments Command (TACOM)
- US Army Tank-Automotive Research, Development and Engineering Center (TARDEC)
- US Navy Clothing & Textile Research Facility (NCTRF)
- Technical Support Working Group (TSWG)

